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10/707,656	12/30/2003	James Kenneth Aragones	RD28217-4	1655

41838 7590 02/28/2007	EXAMINER
GENERAL ELECTRIC COMPANY (PCPI)	THANGAVELU, KANDASAMY
C/O FLETCHER YODER	

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SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/28/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

PTOL-90A (Rev. 10/06)

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>19 December 2006</u>.

2a)☐ This action is **FINAL.**   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle,* 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-33</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-33</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>30 December 2003</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

1.   This communication is in response to the Applicant's Response mailed on

December 19, 2006. Claims 1-33 of the application are pending. This office action is

made non-final.

Specification

2.   The disclosure is objected to because of the following informalities:

Page 20, Para 0043, Lines 15-16, "performance of the of the engine baseline

model" appears to be incorrect and it appears that it should be "performance of the

engine baseline model".

Appropriate correction is required.

Claim Objections

3.   The following is a quotation of 37 C.F.R § 1.75 (d)(1):

> The claim or claims must conform to the invention as set forth in the remainder of the
> specification and terms and phrases in the claims must find clear support or antecedent basis in
> the description so that the meaning of the terms in the claims may be ascertainable by reference
> to the description.

4.   Claims 1-4, 6, 8, 12-15, 17, 23-26 and 28 are objected to because of the

following informalities:

Claim 1, Lines 9-10, "using a regression analysis, wherein the regression analysis relates engine performance variables as a function of engine operating conditions" appears to be incorrect and it appears that it should be "using regression analysis, wherein the regression analysis relates engine performance variables as functions of engine operating parameters".

Claim 2 Lines 2-3, "into a plurality of groups throughout a preselected time moving window" appears to be incorrect and it appears that it should be "into the plurality of groups throughout a preselected moving time window".

Claim 3, Line 2, "into a plurality of groups" appears to be incorrect and it appears that it should be "into the plurality of groups".

Claim 4, Line 4, "a baseline model for each group" appears to be incorrect and it appears that it should be "a baseline model for that group".

Claim 6, Line 5, "identifying parameter estimate trends" appears to be incorrect and it appears that it should be "identifying parameters estimating trends".

Claim 8, Line 2, "component that extract engine data" appears to be incorrect and it appears that it should be "component that extracts engine data".

Claim 12, Line 5, "includes a segmenting the engine data" appears to be incorrect and it appears that it should be "includes segmenting the engine data".

Claim 12, Lines 8-10, "using a regression analysis, wherein the regression analysis relates engine performance variables as a function of engine operating conditions" appears to be incorrect and it appears that it should be "using regression

analysis, wherein the regression analysis relates engine performance variables as functions of engine operating parameters".

Claim 13 Line 2, "into a plurality of groups throughout a preselected time moving window" appears to be incorrect and it appears that it should be "into the plurality of groups throughout a preselected moving time window".

Claim 14, Line 2, "into a plurality of groups" appears to be incorrect and it appears that it should be "into the plurality of groups".

Claim 15, Line 4, "a baseline model for each group" appears to be incorrect and it appears that it should be "a baseline model for that group".

Claim 17, Line 5, "identifying parameter estimate trends" appears to be incorrect and it appears that it should be "identifying parameters estimating trends".

Claim 23, Lines 11-12, "using a regression analysis, wherein the regression analysis relates engine performance variables as a function of engine operating conditions" appears to be incorrect and it appears that it should be "using regression analysis, wherein the regression analysis relates engine performance variables as functions of engine operating parameters".

Claim 24 Lines 2-3, "into a plurality of groups throughout a preselected time moving window" appears to be incorrect and it appears that it should be "into the plurality of groups throughout a preselected moving time window".

Claim 25, Lines 2-3, "into a plurality of groups" appears to be incorrect and it appears that it should be "into the plurality of groups".

Claim 26, Lines 4-5, "a baseline model for each group" appears to be incorrect

and it appears that it should be "a baseline model for that group".

Claim 28, Line 7, "identifying parameter estimate trends" appears to be incorrect

and it appears that it should be "identifying parameters estimating trends".

Appropriate corrections are required.

Claim Rejections - 35 USC § 112

5.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and
> distinctly claiming the subject matter which the applicant regards as his invention.

6.   Claims 2-3 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for

failing to particularly point out and distinctly claim the subject matter which applicant regards as

the invention.

6.1   Claim 2, Line 1 states, "wherein the segmenting component segments". There is

insufficient antecedent basis for "the segmenting component" in the claim. Claim1, Line 5 refers

to only "a data segmenting component".

6.2 Claim 3, Line 1 states, "wherein the segmenting component segments". There is

insufficient antecedent basis for "the segmenting component" in the claim. Claim1, Line 5 refers

to only "a data segmenting component".

Claim Rejections - 35 USC § 101

7. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or
> any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and
> requirements of this title.

8. Claims 1-33 are rejected under 35 U.S.C. 101 because the claimed invention is directed

to non-statutory subject matter.

8.1 Claim 1 states, "A system for quantifying baseline model quality, comprising:

an engine service database ...;

a preprocessor for processing the engine data into a predetermined format ...; and

an engine baseline modeling component that builds an engine baseline model ...".

The claim involves a system for building an engine baseline model using the data in a

database. The system does not produce any useful, tangible and concrete results and therefore is

not statutory and cannot be patented under 35 USC 101. To produce useful, tangible and

credible results, the system should display some results on a display terminal or save the results

in a file for use in analysis and design.

In addition, the system as claimed comprises only software. If all parts of a system are software, then the system becomes functional descriptive material and is not statutory and cannot be patented under 35 USC 101. The system should include some hardware elements to be statutory and patentable.

Claims 2-11 depend on claim 1 but do not produce any useful, tangible and concrete results and therefore are not statutory and cannot be patented under 35 USC 101.

8.2   Claim 12 states, "A method for quantifying baseline model quality, comprising:

storing engine data in an engine service database;

processing the engine data into a predetermined format in a preprocessor;

building an engine baseline model for each of the plurality of groups ...".

The claim involves building an engine baseline model using data in a database. The method does not produce any useful, tangible and concrete results and therefore is not statutory and cannot be patented under 35 USC 101. To produce useful, tangible and credible results, the method should display some of the results on a display terminal or save the results in a file for use in analysis and design.

Claims 13-22 depend on claim 12 but do not produce any useful, tangible and concrete results and therefore are not statutory and cannot be patented under 35 USC 101.

8.3   Claim 23 states, "A computer-readable medium incorporating instructions for

quantifying baseline model quality, comprising:

one or more instructions for storing engine data in an engine service database;

one or more instructions for processing the engine data into a predetermined format in a

preprocessor ...;

one or more instructions for building an engine baseline model ...".

The medium does not produce any useful, tangible and concrete results and therefore is

not statutory and cannot be patented under 35 USC 101. To produce useful, tangible and

credible results, the medium should include instructions that display some of the results on a

display terminal or save the results in a file for use in analysis and design.

In addition, the computer readable medium is described on Page 29 Para 0058 and 0059

of the specification to include the network and paper storing the program. Because of the

inclusion of computer networks and paper, the claim is not patentable under 35 USC 101. Only

computer readable storage or recording medium and the instructions on such medium is

patentable.

Claims 22-33 depend on claim 23 but do not produce any useful, tangible and concrete

results and therefore are not statutory and cannot be patented under 35 USC 101. In addition

instructions on a computer readable medium is not patentable, unless the medium is limited to

computer readable storage or recording medium.

Claim Rejections - 35 USC § 102

9.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10.   Claims 1-6, 8-17, 19-28 and 30-33 are rejected under 35 U.S.C. § 102(b) as being

anticipated by **Bernier et al.** (U.S. Patent 4,215,412).

10.1   **Bernier et al.** teaches Real time performance monitoring of gas turbine engines.

Specifically, as per claim 1, **Bernier et al.** teaches a system for quantifying baseline model

quality (Abstract, L1-5; Fig. 1; CL1, L49-55; CL5, L41-49; CL5, L61 to CL6, L3; CL12, L47-55),

comprising:

an engine service database containing engine data (CL1, L56-60; CL1, L65-67; CL5, L5-

10);

a preprocessor for processing the engine data into a predetermined format (Abstract, L18-

24; CL1, L60-65), wherein the preprocessor includes a data segmenting component that

segments the engine data into a plurality of groups based upon specific engines (Abstract, L18-

24; CL6, L17-23; CL35, L47-54) and further based upon specific time periods during which each

data element was measured (Abstract, L12-16; BSTRACT, L24-29; CL1, L49-55; CL1, L67 TO 2, L4); and

an engine baseline modeling component that builds an engine baseline model for each of the plurality of groups using a regression analysis (CL6, L17-25; CL12, L19-32; C12, L47-55), wherein the regression analysis relates engine performance variables as a function of engine operating conditions (Abstract, L1-5; CL2, L46-53; CL5, L19-28; CL5, L61 to CL6, L3; CL12, L19-32).

Per claim 2: **Bernier et al.** teaches the segmenting component segments the engine data into a plurality of groups throughout a preselected time moving window (CL15, L59 to CL16, L24; CL16, L6-19).

Per claim 3: **Bernier et al.** teaches that the segmenting component segments the engine data into a plurality of groups throughout discrete time ranges (Abstract, L5-18; Abstract, L24-29; CL1, L67 to CL2, L4).

Per claim 4: **Bernier et al.** teaches that the engine baseline modeling component generates a set of estimated regression parameters for each of the plurality of groups based upon the regression analysis, wherein each set of estimated regression parameters are representative of a baseline model for each group (CL5, L41-49; CL5, L61 to CL6, L3; CL12, L47-55; CL15, L59 to CL16, L24).

Per claim 5: **Bernier et al.** teaches that the engine baseline modeling component calculates a time series for each estimated regression parameter, and wherein the engine baseline modeling component further calculates a trend for each estimated regression parameter over time (Abstract, L5-18; Abstract, L24-29; CL1, L67 to CL2, L4; CL15, L59 to CL16, L24).

Per claim 6: **Bernier et al.** teaches means for identifying fluctuations in trends for each estimated regression parameter representative of engine; means for evaluating trends having identified fluctuations; and means for identifying parameter estimate trends relating to baseline trend shifts (CL15, L59 to CL16, L24).

Per claim 8: **Bernier et al.** teaches that the preprocessor comprises a data acquisition component that extract engine data from the engine services database (CL1, L49-67; CL5, L19-28).

Per claim 9: **Bernier et al.** teaches that that the engine baseline modeling component comprises a metric component that validates the engine baseline model (Abstract, L5-12; CL15, L59 to CL16, L24).

Per claim 10: **Bernier et al.** teaches that the engine baseline modeling component comprises a heuristics component that generates rules for cleaning the preprocessed data (Abstract, L18-24; CL1, L60-65).

Per claim 11: **Bernier et al.** teaches a model diagnostics component that evaluates performance of the engine baseline model (Abstract, L5-12).

10.2　As per Claims 12-17, 19-22, 23-28 and 30-33, these are rejected based on the same reasoning as Claims 1-6 and 8-11, <u>supra.</u> Claims 12-17, 19-22, 23-28 and 30-33are method and computer readable medium claims reciting the same limitations as Claims 1-6 and 8-11as taught throughout by **Bernier et al.**

Claim Rejections - 35 USC § 103

11.　The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.

12.　The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1.　Determining the scope and contents of the prior art.
2.　Ascertaining the differences between the prior art and the claims at issue.
3.　Resolving the level of ordinary skill in the pertinent art.
4.　Considering objective evidence present in the application indicating obviousness or nonobviousness.

13.   Claims 7, 18 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Bernier et al. (U.S. Patent 4,215,412) in view of **Gleeson et al.** (U.S. Patent 6,317,654).

13.1   As per claim 7, **Bernier et al.** teaches the system of claim 6. **Bernier et al.** does not

expressly teach that the preprocessor maps engine data to an uncorrelated data set using a principal

component analysis technique. **Gleeson et al.** teaches that the preprocessor maps engine data to an

uncorrelated data set using a principal component analysis technique (CL8, L11-20). It would have

been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the

system of **Bernier et al.** with the system of **Gleeson et al.** that included the preprocessor mapping

engine data to an uncorrelated data set using a principal component analysis technique, because that

would provide a convenient method for data compression and remove any co-linearity in the data

(CL8, L15-18); and provide a statistical basis for selecting significant performance patterns

(CL8, L51-63).

13.2   As per Claims 18 and 29, these are rejected based on the same reasoning as Claim 7,

supra. Claims 18 and 29 are method and computer readable medium claims reciting the same

limitations as Claim 7, as taught throughout by **Bernier et al.** and **Gleeson et al.**

Response to Arguments

14.   Applicant's arguments with respect to 35 USC 103 rejections have been considered.

Claim rejections using new art that is not commonly owned by the assignee have been used.

New claim rejections under 35 USC 112 Second Paragraph and 35 USC 101 have been included

in this office action.

14.1   As per the applicant's argument that "the Aragones reference must be removed from

consideration in accordance with 35 USC 103 (c) because the present invention and the

Aragones reference were at the time the invention was made owned by General Electric

Company", the Examiner has used a new reference **Bernier et al.** that is not commonly owned

by the assignee.

14.2   As per the applicant's argument that "Aragones does not teach building an engine

baseline model; and building a baseline model for each of the plurality of groups using a

regression analysis", the Examiner has used a new reference **Bernier et al.**

     Bernier et al. teaches an engine baseline modeling component that builds an engine

baseline model for each of the plurality of groups using a regression analysis (CL6, L17-25;

CL12, L19-32; C12, L47-55), wherein the regression analysis relates engine performance

variables as a function of engine operating conditions (Abstract, L1-5; CL2, L46-53; CL5, L19-

28; CL5, L61 to CL6, L3; CL12, L19-32).

Conclusion

15.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Dr. Kandasamy Thangavelu whose telephone number is

571-272-3717. The examiner can normally be reached on Monday through Friday from

8:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Paul Rodriguez, can be reached on 571-272-3753. The fax phone number

for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or

proceeding should be directed to TC 2100 Group receptionist: 571-272-2100.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

K. Thangavelu
Art Unit 2123
February 28, 2007